The management of chest tubes in patients with a pneumothorax and an air leak after pulmonary resection.

BACKGROUND: Placing chest tubes to water seal is superior for patients with an air leak, but when a patient has a pneumothorax and an air leak the best chest tube setting is unknown.

METHODS: This is a retrospective analysis of a prospective database on a consecutive series of patients who had a pneumothorax and air leak on the same day. Patients underwent elective pulmonary resection by one surgeon and had their chest tubes placed to water seal on postoperative day 1. Daily chest radiographs were obtained, and the size of the pneumothorax and air leak were measured. Tubes were left on seal unless there was a symptomatic enlarging pneumothorax or subcutaneous emphysema (defined as failing water seal). The primary objective was to evaluate the efficacy of water seal. We also wanted to identify risk factors that predicted failure of water seal.

RESULTS: There were 838 patients > or = 21 years old who underwent elective pulmonary resection, and 86 patients (10%) had an air leak and a concomitant pneumothorax on the same day. Fourteen patients (16%) failed water seal. Multivariate analysis showed that a large air leak (greater than or equal to expiratory 3 in our classification system; odds ratio [OR], 16.5; p < 0.001) and a pneumothorax > 8 cm in size (OR, 4.9; p < 0.005) were predictors of failing water seal.

CONCLUSIONS: Keeping chest tubes on water seal is safe for most patients with an air leak and a pneumothorax. However, if the leak or pneumothorax is large, then subcutaneous...
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Emphysema or an expanding symptomatic pneumothorax is more likely. A prospective randomized trial is needed to compare water seal to suction in these patients.